Eco-Friendly Cycling Helmet

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Coconut trees are widely planted in Suratthani province. A coconut fruit composed of four layers: the outermost layer of husk, the coconut shell, the coconut meat and the coconut juice respectively. We observed that the coconut fruits fell from the tree were not broken. This indicated that the coconut husk should be strong enough to withstand high impact and protect the inner shell from damage. We hope to use it to make protective helmet for cycling as an alternative for the expensive polystyrene helmet. Therefore, we set up experiments to investigate the properties of the coconut husk and the possibility to use it to make protective bicycle helmet. It was found that coconut husk covering fresh eggs can protect 100% of them from breaking when dropped from 2 m height, better than coir, dust and husk. Experiment with coconut husk at different ages showed that 270 days old coconut fruit ,when the husk changes color from green to brownish green color, was most suitable for making helmet and even better when the coconut was kept at 30 °C for 7 days. The thickness of the coconut husk is in thicker than 1.5 cm in average. Impinge-proof test, by placing a water balloon and an artificial human skull in the coconut helmet and a certify CPSC standard helmet, showed no damage to the tested objects. The eco- helmet is about 13.74% heavier than the general bicycle. Chin strap joined to the helmet passed the Snell M2000 standard by testing its capability of impact force protection. The eco-helmet can be biodegraded and cost only 6 USD, 30 times lower than the polystyrene helmet which cost 185.5 USD. Thus, the cheap environmental friendly helmets should be able to encourage increase usage of helmet among bicyclists.

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